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## SUNFLOWER PRODUCTION

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## SOUTHERN ALBERTA

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Southern Alberta farmers have grown sunflowers for seed on a commercial scale for two years, 1958 and 1959. It would appear that sunflowers can be grown successfully for seed in a fairly large area on both irrigated and dry land. The most favorable areas are from Lethbridge to Medicine Hat, including the Eastern Irrigation District to the north, because sunflowers require a fairly long growing season. The extent of the area of profitable production will be influenced also by the cost of transportation to the processing plant.

Production procedures outlined in this pamphlet are largely based on practices developed in Manitoba and on experiences and observations in southern Alberta during the past two years. Only a limited amount of experimental work has been done in southern Alberta. More detailed information may be found in Publications 1019, "Sunflower Seed Production", and 944, "Insect Pests of Sunflowers in Manitoba", free from Information Division, Canada Department of Agriculture, Ottawa, Ontario; also 1008, "Diseases of Field Crops in the Prairie Provinces", price 50 cents, from the Queen's Printer, Ottawa, Ontario.

#### Advantages of Growing Sunflowers

- 1) Suitable for irrigated and dry land.
- 2) Resistant to spring frost and reputedly has some resistance to drought.
- 3) Good ability to compete with annual weeds.
- 4) Little additional equipment required.
- 5) Low cost of seed per acre.
- 6) Easily harvested.
- 7) Marketed as a cash crop.

#### Varieties and Seeding Rates

Advance and Beacon, grown for oil production, are seeded at 4 to 6 pounds per acre on dry land and 6 to 9 pounds on irrigated land. For Mennonite, a larger seeded variety, the rate is 1 pound greater. The recommended seeding rates allow for some

thinning by cross-harrowing for weed control. The final stand should have about 10 to 15 plants per 10 feet of row on dry land and 15 to 20 plants on irrigated land. Since seed size has such an important bearing on rate of seeding, the suppliers instructions should be followed. On dry land the crop is seeded in rows 28 to 42 inches apart while under irrigation the row spacing is 22 to 28 inches.

### Fertilizers

There is only limited information on the value of fertilizers, but in most cases fertilizers will be more profitable on low-producing land than on land of known high production. Response on dry-land fallow, in most cases, does not appear profitable. On stubble there is some indication of profitable returns from 30 to 40 pounds of nitrogen per acre and, on some soils, an additional 45 pounds of  $P_2O_5$ .

Fertilizer response is likely to be profitable on irrigated land, particularly when it is known that crops grown previously have responded profitably.

Regardless of yield consideration, fertilizers tend to hasten maturity, permit earlier harvesting, and improve the seed grade.

Fertilizers should not be applied with the seed and therefore should be broadcast before seeding or applied in bands alongside the row.

### Seed Bed Preparation and Seeding

Shallow cultivation should be done to destroy weeds and make a firm seed bed. On irrigated land suitable cultivation or ploughing followed by floating will be necessary.

Protection against soil drifting should be given consideration. Sunflowers on dry land should be grown on relatively narrow field strips protected by a moderate trash cover. Under

such circumstances a standard drill will do a good job of seeding and the row-crop cultivator equipped with hiller disks and shovels will provide satisfactory cultivation. Firm, moderately lumpy seed beds should be used on both dry and irrigated land. Drifting can be controlled in its early stages by making ridges between the rows with chisels or narrow shovels operated at a shallow depth.

To ensure uniform germination it is important to seed into moist soil. with a firm seed bed this will likely be possible at a depth of about 2 inches. Under dry surface soil conditions seeding up to 4 inches deep has given good results. Rows north and south are favored.

Sunflowers should be seeded as early as grain to obtain high yields. They require a growing season of about 130 days. The young plants can withstand about 6 degrees of frost, but the developing seed is easily damaged by fall frosts. Therefore, it is wise to seed early. The mature seed can withstand adverse weather.

### Seeding Equipment

An ordinary grain drill can be used for seeding by covering the necessary runs to provide the chosen row spacing. Cover runs with tin, cardboard, or masking tape.

More uniform seeding may be done with a row-crop planter properly adjusted for seeding sunflowers, but farmers will find that they can handle only light amounts of trash with such a planter.

Frequent checks should be made to ensure that the seed is running freely and is not blocked with pieces of stems or other foreign matter.

### Cultural Weed Control

If possible, one crop of weeds should be destroyed before seeding. Following seeding, weed control depends on cross-

harrowing and careful row cultivation. If there is a secret in successful sunflower production, it is probably the practice of cross-harrowing in the seedling stage. Light diamond harrows or similar equipment should be used. The crop should be cross-harrowed at least once before emergence. When the plants are in the 4- to 6-leaf stage they are well rooted and can be cross-harrowed again without burying too many plants. The most effective weed kill and the least damage to the plants is secured on a warm clear day. Up to five harrowings may be required, depending on the weed situation.

When the plants are about a foot high a row-crop cultivator with hilling disks or weeder knives will be required to control weeds. Shallow cultivation will avoid damage to the roots. For the first cultivation the disks should be set to operate as close to the plants as possible, throwing the soil away from the plants. The cultivator shovel following should push the soil into the grooves made by the disks. Subsequent cultivations should throw the soil against the plants, covering small weeds and giving added root stability. The last cultivation will be when the plants are 2 to 2½ feet high and before budding. The number of row cultivations will vary from 2 to 5.

### Chemical Weed Control

There are only a few herbicides suitable for the control of weeds in sunflowers, and they are all used as pre-planting treatments. This requires the chemical to be applied to the soil surface prior to planting and immediately incorporated into the soil to a depth of 2 to 3 inches. I.P.C. is used only to control wild oats. CIPC is used for wild oats and green foxtail and will give some measure of control of broad leaf annual seedlings. Avadex is suggested on a trial basis for wild oats and may give some control of green foxtail. Recommendations for the use of herbicides must be carefully followed. The chemical cost may be reduced by band application.

Sunflowers are easily damaged by 2,4-D and MCPA, and when these herbicides are being used on nearby crops, the following precautions should be taken:-

- 1) Use amine or sodium salts or low volatile esters.
- 2) Spray when a slight breeze is blowing away from the sunflowers.
- 3) Do not use dusts.
- 4) Cooperation is necessary from everyone using herbicides in the district.

Weed sprayers to be used for application of insecticide to sunflowers should be thoroughly cleaned prior to use.

A method of cleaning a sprayer of 2,4-D is to rinse the tank and spray system thoroughly with successive rinses of:

(1) water, (2) kerosene, fuel oil, or diesel oil, and (3) detergent or soap suds. After this the entire spray system should be filled with an ammonia solution (about one pint of household ammonia to each 10 gallons of hot water) and the solution allowed to stand in the system for 18 hours or 36 to 48 hours with cold water. After draining the ammonia solution it is important to rinse the entire spray system two or more times with clean water.

### Irrigation

Adequate moisture is required for high seed production. Fall irrigation with the soil wetted to a depth of 4 feet is recommended. If the land has not been irrigated in the fall, the crop will require irrigating about the middle of June. One more irrigation about the end of July should provide sufficient moisture to support the crop and permit reasonably early maturity.

Most fields will be flood irrigated but, if sprinkling is used, it is advisable to leave spaces at intervals for the pipe and to use longer risers.

### Insects

Chemical control of insects attacking sunflowers should be kept to a minimum. Insects are pollinators of sunflowers, and

there are also insects that prey on some of the most serious pests; these could be killed by improper use of chemicals and thus do more harm than good.

Wireworms, cutworms, grasshoppers, and beet webworms attack sunflowers and, if serious, may require chemical control. Control of these is in general the same as for other crops.

There are a number of insect pests that are more specific to sunflowers. These include insects that feed in the developing head and one that tunnels in the pith of the stem. These are best controlled culturally, as they are attacked by parasites and predators that will naturally reduce their populations. Repeated inspections of the fields for these insects should be made. If extensive damage is found, it should be reported to the District Agriculturist or company fieldman before undertaking any chemical control. Planting at a distance from sunflower fields of the previous year will tend to lessen the infestation of these pests.

The sunflower beetle and periodically the caterpillar of the painted lady butterfly feed on the leaves of young plants. If it appears that they will seriously defoliate the young plants, spray with one pint of 25 per cent DDT emulsion concentrate per acre. The amount of water to use may be varied with the type of sprayer.

## DISEASES

Sunflowers are subject to attack by various diseases. These diseases cannot be economically controlled after the plants have become infested and symptoms appear. Therefore, every effort should be made to prevent infestation.

The main diseases are sunflower rust, sclerotinia wilt, and downy mildew. These are caused by fungi that overwinter in the dead sunflower plants and the soil. Therefore, the main form of prevention is good crop rotation practices. Do not plant sunflowers on the same land more than once every 4 years. Locate the new field as far as possible from sunflowers of the previous

year. Eradicate all wild and volunteer sunflowers from adjacent land.

Sunflower rust does not have an alternate host as do the cereal rusts, but the spores that cause the initial infection must come from the trash of wild or cultivated sunflowers. This initial infection then produces spores that may spread from a few plants, including wild and volunteer, to a whole field.

Sclerotinia wilt also occurs on several broad-leafed plants such as safflower, sugar beets, potatoes, tomatoes, peas, alfalfa, sweet clover, and many fleshy weeds but not on cereals or corn. Remember this in planning the rotation.

Downy mildew spores will remain in the soil for several years. This disease may also carry over on several weeds such as wild sunflower and thistles.

Rotation and distance between new seeding and last year's sunflower fields along with weed control are therefore the best means of disease control. The variety Beacon is resistant to rust but growing this variety should not alter any of the cultural practices that are recommended.

### Birds

Blackbirds have been known to destroy isolated fields near areas of still water bordered by a rank growth of reeds. Planting sunflowers near such areas should be avoided.

Some protection from birds may be obtained with the proper use of noise makers.

### Harvesting

The date of harvesting will depend largely on the date of seeding and growing conditions. The moisture content of the seed is the best guide for starting harvesting, since the seed should not be binned with more than 12 per cent moisture. The safe level for all weather storage is 9.5 per cent.

Straight combining is the only practical method of harvesting. Consult the combine operator's manual for the adjustments required for sunflowers. A sunflower stripper attachment is required.

Complete instructions for making combine adjustments and the stripper attachment are given in C.D.A. Publication 1019, "Sunflower Seed Production". The attachment can be made in a good farm machine shop but most growers will prefer to purchase one from a firm that specializes in manufacturing them.

Besides the publications listed on page 1, further information may be obtained from District Agriculturists, processing company fieldmen, and the Lethbridge Research Station.



- Safflower